Space Weather Forecast

Issued on Saturday, 16 July 2022 at 01:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 radio blackouts due to moderate-class X-ray flares likely.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low in the past 24 hours, with numerous Common-class flares, and background x-ray flux in the Common-class category. There are currently seven sunspot regions on the visible disc, many of which are large and mature, although the magnetic structure of most of them is fairly straightforward.
There are also several large filaments (arcs of plasma) on the visible disc, one of which in the NW quadrant erupted between 15/1300-1600 UTC. It appears to have produced a partial halo Coronal Mass Ejection (CME) in satellite imagery, although there are limited images with which to assess this CME at the present time. It is slow, although as a filament eruption it is likely quite dense, and is not expected to reach Earth until late on 19 July or on 20 July. No other Earth directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: The solar wind has been elevated over the past 24 hours, likely the result of coronal hole fast wind influences. The speed was elevated throughout, mostly varying between 540-580 km/s. The Interplanetary Magnetic Field was mostly weak, with the north-south component varying mainly weakly, but mostly southward directed. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is Likely to be Moderate, with a daily Slight Chance of Strong flares. Two of the current large sunspots should leave the Earth-facing side on Days 3 and 4 (18-19 July), resulting in a slight reduction in flare probability. Arriving bright flux over the eastern limb may compensate for any loss, however.

Solar Wind / Geomagnetic Activity: A filament eruption appears to have produced a partial halo CME. There are limited images with which to assess this CME at the present time but it appears slow, and is not expected to reach Earth until late on 19 July or on 20 July. Otherwise, solar winds are expected to slowly decline to near background levels through Days 1 and 2 (16-17 July). A further fast wind from a coronal hole is likely to give wind speeds up to 450-500 km/s, most likely on Day 4 (19 July).
Geomagnetic activity is expected to be mostly Quiet, perhaps with the odd Unsettled interval on Day 1. The fast wind may give an increase on Day 4 to Unsettled, perhaps Active levels. The CME as mentioned above is unlikely to arrive until after the end of Day 4, but may give G1/Minor Storm intervals.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, however there is a daily slight chance of S1 or greater given the number of large regions transiting westward across the facing side of the Sun at present.
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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	50	40
Very Active	R3 to R5 X	No	10	10	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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